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09/640,204	08/16/2000	Andrew C. Singer	1201.63069	3214

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EXAMINER
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CORRIELUS, JEAN B

ART UNIT	PAPER NUMBER
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2637

DATE MAILED: 12/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/640,204

Applicant(s)

SINGER ET AL.

Examiner

Jean B Corrielus

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-11 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 12, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### **Claim Objection**

1. Claims 11-14 are objected to because of the following informalities. Claim 11, lines 6, "estimate's output distribution" should be replaced by "estimate and the corresponding output distribution" so as to be consistent with antecedent in lines 4-5.

Claims 12-14 are likewise objected because of their dependency to claim 11.

2. Applicant's arguments, see page 10, lines 1-3, filed 8/23/04, with respect to claim 5 have been fully considered and are persuasive. The rejection of claim 5 has been withdrawn.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-4 and 9-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Gamal et al US patent No. 6,671,338.

As per claims 1 and 11, Gamal et al discloses a method and apparatus (fig. 6 or fig. 7) having a SISO MMSE filter (equalizer) 144 having an input for

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receiving data from a noisy channel see fig. 6; inputting a set of prior symbol values on feedback path to said filter (equalizer) 144; equalizing by an MMSE equalization in the SISO equalizer 144 the data received over the noisy channel and the set of prior symbol values to produce a symbol value estimate at the output of 144; using the decoder 150 to decode (mapping) the equalizer output onto the prior symbol values to produce a confidence indication in each of the symbol value estimate as a function of time (see abstract).

As per claim 2, Gamal et al includes inherently the further step of setting parameters of the equalizer 144 in accordance to MMSE criterion over the channel noise and the symbol values.

As per claim 3, Gamal et al further comprising the steps of passing the output of the equalizer to a SISO decoder 150 and using the output of the error decoder as the set of prior symbol values and repeating all steps of the method until a predetermined convergence criterion is reached between said SISO error correction decoder 150 and said Equalizer 144.

As per claim 4, the method further includes the step of deinterleave the output of the equalizer prior to decoding see fig. 7.

As per claim 9, the method further comprises the steps of deinterleaves and reserializing data output of the equalizer; decoding the deinterleaved data and repeating the steps until a predetermined convergence is met between the equalizing and decoding steps see fig. 7.

As per claim 10, Gamal further teaches that the method further includes the step of deinterleave the output of the equalizer prior to decoding using

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deinterleaver 148. In addition, fig. 7 shows an iterative decoding process for a subsequent channel by repeating the performing of soft equalization while inherently substituting said deinterleaved output for said set of priors and substituting output from said mapping step for said second channel for said data received until a predetermined convergence is reached see fig. 7.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamal et al US patent No. 6,671,338 in view of applicant's admitted prior art (see comment filed on 10/20/03, second full paragraph).

As per claim 7, Gamal discloses every feature of the claimed invention but does not explicitly teach the further limitation of using a fast update equalization of order of  $M^2$ , which exploits redundant computations in successive equalizer computations. However, as acknowledged by applicant in the response, filed on 10/20/03, see comment section, second full paragraph, using a fast equalizer update in the order of  $M^2$  is old and well established in the art. Given that, it would have been obvious to one skill in the art to implement the equalizer using such an update algorithm in order to enhance the equalization process.

As per claim 8, applicant comment filed on 10/20/03, second full paragraph, further stated that applying a matrix inversion lemma to a matrix to be inverted in a design of equalization coefficients for the SISO MMSE equalizer is old and well established in the art. Given that fact, it would have been obvious to one skill in the art to apply such matrix in Gamal et al and the reason to do so would have been the same as provided in reference to claim 7 above.

### ***Allowable Subject Matter***

7. Claims 5, 6, 12, 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Response to Arguments***

8. Applicant's arguments filed 8/23/04 have been fully considered but they are not persuasive. Page 7, third full paragraph of the comment stated that Gamal does not teach the use of MMSE equalization which concerns addressing intersymbol interference. The comment at page 8, lines 18-21, went further to emphasize on the function of an equalizer as a device to remove intersymbol interference due to temporal dispersion effect on a given channel and states at page 9, lines 8-10, that the transversal filter of Gamal is not configured to address self-interference of one signal as there is no disclosure to accomplished the same. Examiner agrees with the applicant that an equalizer is a device used to remove intersymbol interference and disagrees however that Gamal filter does not remove intersymbol interference. As known in the art, a transversal filter is an equalizer

as one of its functions is to remove intersymbol interference from a received signal. Gamal at col. 13, lines 10-14, teaches that the transversal filter received a feedback signal from the decoder in order to remove ISI, an acronym that stands for intersymbol interference.

It is further asserted that Gamal does not teach a different set of equalizer coefficients for each output data symbol. However, such limitation is not in the claim(s). However, for the sake of argument, fig. 7 shows that feedback and feedforward coefficients on a feedback path to the transversal filter 144 in order to update its coefficients.

It is the applicant's position that the examiner uses his [applicant's] own disclosure and prior comments regarding the specification as evidence. However, it is noted that the examiner relies only on what applicant's considered as well known in the art as evidence and not applicant own disclosure.

### ***Conclusion***

**9. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will


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the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Monday to Thursday from 8:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-3086. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jean B Corrielus  
Primary Examiner  
Art Unit 2637

12-09-04